163

#15
5-5-03

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of:

Robert R. BUCKLEY et al.

Application No.: 09/368,354

Filed: August 5, 1999 Docket No.: 103044

For: METHODS AND SYSTEMS FOR UNDERCOLOR REDUCTION

BRIEF ON APPEAL

Appeal from Group 2622

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400
Attorneys for Appellants

TABLE OF CONTENTS

I. INTRODUCTION

This is an Appeal from an Office Action mailed August 28, 2002, finally rejecting claims 1-22 of the above-identified patent application.

A. Real Party in Interest

The real party in interest in this Appeal in the present application is Xerox Corporation, by way of an Assignment filed on September 1, 1999, and recorded at Reel 010204/Frame 0560.

B. Statement of Related Appeals and Interferences

There are presently no appeals or interferences, known to Appellants, Appellants' representative or the Assignee, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

C. Status of Claims

Claims 1-22 are pending. Claims 1-22 are on appeal. Claims 1-22 are set forth in the attached Appendix. Claims 1 and 10 are independent claims. Claims 2-4, 6, 9, 21 and 22 depend directly from claim 1. Claims 5, 7 and 8 depend indirectly from claim 1. Claims 11-13, 15 and 18-20 depend directly from claim 10. Claims 14, 16 and 17 depend indirectly from claim 10.

D. Status of Amendments

The Amendment filed on June 14, 2002 is the only Amendment filed, and the Amendment has been entered. A Request for Reconsideration After Final Rejection was filed in the U.S. Patent and Trademark Office on November 29, 2002 in response to the August 28, 2002 Final Office Action. A December 17, 2002 Advisory Action indicates that the November 29, 2002 Request for Reconsideration After Final Rejection has been considered but does not place the application in condition for allowance. The Advisory Action further

indicates that, for purposes of appeal, claims 1-22 are rejected. All claim amendments have been entered of record.

Independent claims 1 and 10, as amended, are found in the June 14, 2002 Amendment. Claims 2-9 and 11-22 are originally filed claims, which have not been amended.

II. SUMMARY OF THE INVENTION AND APPLIED REFERENCES

A. Related Art Problems Overcome by the Invention

Marking an image in which black text or other dark features are superimposed on a colored background may be performed by marking the colored background first and then marking the text or other dark features on top of the background marking material. This eliminates or masks any mis-registration of the text or other dark features with respect to the background. However, simply overmarking the text or other dark features on top of the background marking material can result in an excessive build-up of marking material on a marking substrate, which in turn causes marking material transfer problems and/or problems with the marking substrate, such as paper cockling and/or curling when the marking substrate is paper.

Current methods for undercolor reduction apply a reduced amount of background marking material to areas that are to be overmarked. In these methods, a temporary record is kept of each color separation bitmap of an image to be marked so that, prior to actual marking, locations where a black marking material is to be marked over one or more of cyan, magenta and yellow marking materials are known. Data for colors underlying the black marking material can then be modified so that a reduced amount of these underlying colors are marked on the marking substrate.

The above-described methods typically require custom software to implement undercolor reduction in conjunction with a raster image processor (RIP), because a typical

RIP output is a raster image that only contains on-top or visible colors. Underlying colors are typically discarded during the raster image processing. Therefore, additional software is needed to retain the information of the underlying colors.

B. Features of the Invention

One set of features provided by the invention includes performing undercolor reduction using an existing raster image processor. The method according to this invention processes image data of a color image containing overmarked pixels where at least one first color is to be overmarked by a second color. This processing includes generating information that designates the overmarked pixels, performing raster image processing to create a raster image of the color image, and modifying image data of the overmarked pixels in the raster image. The raster image processing includes overmarking processing that allows both the at least one first color and the second color to be included in the marked pixels in the same raster image.

Another set of features provided by the invention includes modifying a value of image data corresponding to the at least one first color. This results in a reduced amount of marking material corresponding to the at least one first color being applied to a marking substrate.

An additional set of features provided by the invention includes generating information that designates the overmarked pixels in the form of tags.

A further set of features provided by the invention includes performing pattern recognition to recognize specified patterns, and designating pixels that form these specified patterns as the overmarked pixels.

In the systems and methods of this invention, raster image processing is performed that allows both underlying color information and overmarked color information to be stored in a same pixel in a raster image. The underlying color information in the raster image is

modified to a reduced value, i.e., a value at which a reduced amount of marking material is applied when marking is performed.

C. Description of the Exemplary Embodiments

Fig. 1 shows a functional block diagram of a first exemplary embodiment of an image processing system 100 according to this invention. The image processing system 100 includes an input/output interface 110, a controller 120, a memory 130, an overmarked pixel designator 140, a raster image processor (RIP) 150, a data modification unit 160 and a marking driver 170, all of which are interconnected by a data/control bus 180. The overmarked pixel designator 140 includes a tag generator 142 that generates tags and associates the tags with individual pixels as described below. The image processing system 100 shown in Fig. 1 is connected to a data source 200 and a data sink 300 via the interface 110.

The image processing system 100 may be a digital printer, digital copier or the like. In this case, the data source 200 would correspond to a page description language (PDL) or printer control language (PCL) emitter and the data sink 300 would correspond to a digital printer or the printing unit of a digital copier.

In the exemplary embodiment shown in Fig. 1, processing within the image processing system 100 is performed under control of the controller 120. Color image pixel data is input from the data source 200 via the input/output interface 110. The input color image pixel data may be temporarily stored in the memory 130.

The overmarked pixel designator 140 generates information that designates overmarked pixels among the color image pixel data. Overmarked pixels are pixels in which a top color, such as black, is to be marked over any combination of underlying colors, such as cyan, magenta and yellow. Specifically, in the exemplary embodiment shown in Fig. 1, the tag generator 142 in the overmarked pixel designator 140 generates a tag for each overmarked

pixel. The tags are associated with the respective overmarked pixels, and designate the overmarked pixels as "black image", "black text", "black stroke" or the like.

The actual tag used to designate the overmarked pixels may vary. Preferably, a "black text" tag is used for designating black text pixels, because a "black text" tag clearly indicates that overmarking is to be performed in the associated pixel. If merely a "text" tag were used, for example, it could not be discerned, based solely on the tag, whether a pixel with CMYK values=c,m,y,1 is the result of overmarking a CMYK=c,m,y,0 with black, or marking CMYK=c,m,y,1 directly. However, if CMYK=c,m,y,1 is a seldom-specified text color, then an assumption may be made that CMYK=c,m,y,1 signifies an overmarked pixel, and a "text" tag can effectively designate an overmarked pixel.

The raster image processor 150 creates a raster image from the input color image pixel data. Unlike a conventional raster image, the raster image created by the raster image processor 150 allows both underlying colors and top colors to be included. This is accomplished by an overmarking function that is provided in the raster image processor 150. The overmarking function may be implemented, for example, in a PostScript implementation by using the setoverprint operator with value true whenever overmarking is desired. Setoverprint could be set true just before black text is printed, or the show operator used to print black text could be overloaded with an operator that included the setoverprint operator.

The data modification unit 160 modifies data in the raster image that has been created by the raster image processor 150. More specifically, the data modification unit 160 modifies values of data that corresponds to the underlying colors in overmarked pixels. For example, where a value of data that corresponds to an underlying color in an overmarked pixel indicates an amount of corresponding marking material to be put down on a marking substrate, the data modification unit 160 reduces this value so that a reduced amount of the corresponding marking material will be put down.

The amount by which the marking material is reduced may be determined according to previously determined methods. For example, each underlying color present may be reduced by a specified percentage, and/or reduction may be performed such that the total amount of marking material to be applied for a given pixel is less than or equal to a specified amount.

After the data of the overmarked pixels has been modified as described above, the raster image is sent to the marking driver 170, which generates marking control signals and/or other marking control information to be output to the image data sink 300 to enable marking to be performed based on the modified raster image.

Fig. 2 is a functional block diagram of a second exemplary embodiment of an image processing system according to this invention. The image processing system 400 shown in Fig. 2 is identical to the image processing system 100 shown in Fig. 1, except that the image processing system 400 of Fig. 2 has a pattern recognition system 144 instead of the tag generator 142. Therefore, explanation of elements other than the pattern recognition system 144 is omitted.

The pattern recognition system 144 is, for example, an optical pattern recognition system, such as an optical character recognition (OCR) system or the like, that analyzes input image data according to known OCR methods to determine specified patterns, such as text. The pattern recognition system 144 designates pixels that form recognized patterns as overmarked pixels. It should be appreciated that other known or later-developed text or pattern recognition systems may be used instead of OCR. Furthermore, rather than recognizing text, other patterns, such as strokes or the like, may be recognized. A stroke is a line of some thickness.

Fig. 3 is a flowchart outlining one exemplary embodiment of a method for implementing undercolor reduction according to this invention. Beginning in step S1000,

control continues to step S1100, where color image data is input. Then, in step S1200, a raster image is created based on the color image data. Overmarked pixels are designated in the raster image. Control then continues to step S1300.

In step S1300, values of underlying colors in the overmarked pixels in the raster image are modified to create a modified raster image. Next, in step S1400, the modified raster image is output to a marking driver. Then, in step S1500, an image is marked on a substrate based on the modified raster image. Finally, in step S1600, the control procedure ends.

Fig. 4 is a flowchart that outlines in greater detail a first exemplary embodiment of the raster image creating step S1200 of Fig. 3. Beginning in step S1200, control continues to step S1210, where tags are generated for overmarked pixels and associated with the overmarked pixels. It should be appreciated that, rather than generating tags during the creation of the raster image, the tags may have been generated previously. The control procedure then continues to step S1220, which returns control to step S1300.

Fig. 5 is a flowchart that outlines in greater detail a second exemplary embodiment of the overmarked pixel designation step S1200 of Fig. 3. Beginning in step S1200, control continues to step S1230, where pattern recognition is performed. Then, in step S1240, pixels that form patterns that have been recognized are designated as overmarked pixels. Next, in step S1250, control is returned to step S1300.

D. The Claimed Subject Matter

A full list of claims appears in the Appendix. Appellants reproduce here six claims, which are illustrative of the five groups of claims which do not stand or fall together. In this regard, independent claims 1 and 10, both of which are reproduced here because they are independent claims, stand or fall together.

Independent claim 1 recites a method of processing color image data containing overmarked pixels where at least one first color is to be overmarked by a second color, the method comprising (1) generating information that designates the overmarked pixels, (2) performing raster image processing to create a raster image of the color image, the raster image processing including overmarking processing that allows both the at least one first color and the second color to be included in the overmarked pixels in the same raster image, and (3) modifying image data of the overmarked pixels in the raster image.

Dependent claim 5 recites the method of claim 4, wherein the modified value of the image data corresponding to the at least one first color results in a reduced amount of marking material corresponding to the at least one first color being applied to a marking substrate.

Dependent claim 6 recites the method of claim 1, wherein generating information that designates the overmarked pixels comprises generating tags that correspond to the overmarked pixels.

Dependent claim 8 recites the method of claim 6, wherein the overmarked pixels correspond to one of black text and a black stroke, and the tags indicate that the overmarked pixels are one of black text pixels and black stroke pixels.

Dependent claim 9 recites the method of claim 1, wherein generating information that designates the overmarked pixels comprises (1) performing pattern recognition that recognizes specified patterns, (2) designating pixels that form the recognized patterns as the overmarked pixels.

Independent claim 10 recites a system that processes image data of a color image for marking, the color image containing overmarked pixels where at least one first color is to be overmarked by a second color, the system comprising (1) an overmarked pixel designator that generates information that designates the overmarked pixels, (2) a raster image processor that creates a raster image of the color image, the raster image processor provided with an

overmarking function that allows both the at least one first color and the second color to be included in the overmarked pixels of the raster image, and (3) an image data modification unit that modifies image data of the overmarked pixels in the raster image.

E. The Applied References

1. U.S. Patent 6,289,364 to Borg et al.

Borg et al. (hereinafter, "Borg") discloses a device and method for graphically processing digital documents in a raster image processor using transparency information. The transparency of a graphical object indicates the extent to which an underlying object may be seen through it. (See Borg, col. 1, lines 6-24)

Borg processes an object's transparency through a technique known as blending. Blending involves combining a foreground color, associated with a foreground graphical object, and a background color, associated with a background graphical object, to create a third color. Blending can give an object the appearance of being translucent. (See Borg, col. 1, lines 28-33, col. 3, lines 16-28)

Borg provides page description language extensions that allow blending operations to be performed within a raster image processor. These extensions include specification of a desired blending operation (e.g., normal, shadow, glow, darker, lighter, add, and overprint), a constant opacity parameter, and a position opacity parameter associated with an opacity data structure. (See Borg, col. 1, lines 28-51)

In Borg, blending generally occurs in two stages and is controlled though the BlendMode 405 key of the blend data structure 400 shown in FIG. 4. In the first stage, the foreground image and background colors are combined in accordance with a specified blending function. In the second stage, the resulting color is multiplied by the foreground image's opacity. (See Borg, at col. 4, lines 7-14)

Borg, at col. 2, line 42 to col. 3, line 3, and in FIG. 1, discloses a graphical processing system 100 having a computer 105 and a raster image processor (RIP) device 115. The computer 105 transmits information to the RIP 115 in the form of a file 110 whose graphical contents are represented in a page description language (PDL). An interpreter 120 executes the PDL file's 110 instructions and conveys the interpreted data to a renderer 125. The renderer 125 generates a raster based representation of its input.

In Borg, the PDL file 110 sent from the computer 105 to the RIP 115 contains blending information. As stated above, the RIP 115 performs the graphic object blending operations. However, to perform blending operations, the PDL file must be extended to include structures that incorporate blending information and instructions that operate on this information. (See Borg, at col. 2, line 62 to col. 3, line 4)

2. U.S. Patent 5,075,787 to Shaughnessy et al.

Shaughnessy et al. (hereinafter, "Shaughnessy") discloses an apparatus and method for producing selectively edited reproductions of an original document where areas of information on the original document are encircled or delimited and alphanumerically character-coded with the use of a highlighting means to designate the area for editing. (See Abstract in Shaughnessy).

In Shaughnessy, an operator manually identifies desired areas of information on the document, manually encircles or delimits these areas by using a highlighter pen or the like, and then alphanumerically character-codes the desired, highlighted areas of information for processing. (See Shaughnessy, at col. 5, line 66 to col. 6, line 65, and in FIG. 3)

The photocopier device 10 in Shaughnessy utilizes the information that was manually identified and encoded on a hardcopy document to generate a revised reproduction of the image data. Examples of the types of information being processed and alphanumerically character-coded by Shaughnessy includes (a) data erasure and deletion from the hardcopy document, (b) screen tint overlay in selected areas of the document, (c) document margin

shift, (d) sheet renumbering, etc. (See Shaughnessy, at col. 12, line 56 to col. 13, line 18, col. 14, line 17 to col. 17, line 59)

III. THE ISSUES ON APPEAL

1. Are claims 1-5, 10-14 and 19-22 properly rejected under 35 USC §103(a) as unpatentable over U.S. Patent 6,289,364 to Borg et al.?

2. Are claims 6-9 and 15-18 properly rejected under 35 USC §103(a) as unpatentable over Borg in view of U.S. Patent 5,075,787 to Shaughnessy et al.?

IV. GROUPING THE CLAIMS ON APPEAL

Five distinct groups of claims, which are separately patentable, exist in the application and, upon issuance of a patent, will be entitled to a separate presumption of validity under 35 USC §282. For convenience of handling of this Appeal, the claims are grouped as follows:

Group I: Claims 1-4, 10-13 and 19-22

Group II: Claims 5 and 14

Group III: Claims 6, 7, 15 and 16

Group IV: Claims 8 and 17

Group V: Claims 9 and 18

Each of Groups I-V will be argued separately in the following arguments. The groups do not stand or fall together.

V. LAW

A. 35 USC §103(a) (Obviousness)

In rejecting claims under 35 USC 103, it is incumbent on the examiner to establish a factual basis to support the legal conclusion of obviousness. See, In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the Examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one of ordinary skill in the pertinent art would

have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal Inc. v. F-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir. 1988), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the Examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note, In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). The mere fact that the prior art may be modified in the manner suggested by the examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). To establish prima facie obviousness of a claimed invention, all the claim limitations must be suggested or taught by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1970). All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). It is well settled that a rejection based on 35 USC 103 must rest on a factual basis, which the Patent and Trademark Office has the initial duty of supplying. In re GPAC, Inc., 57 F.3d 1573, 1582, 35 USPQ2d 1116, 1123 (Fed. Cir. 1995). A showing of a suggestion, teaching, or motivation to combine the prior art references is an "essential evidentiary component of an obviousness holding." C.R. Bard, Inc. v. M3 Sys. Inc., 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232(Fed. Cir. 1998). This evidence may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved. See Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc., 75 F.3d 1568, 1573, 37

USPQ2d 1626, 1630 (Fed. Cir. 1996). However, the suggestion more often comes from the teachings of the pertinent references. See In re Rouffet, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459(Fed. Cir. 1998). This showing must be clear and particular, and broad conclusory statements about the teaching of multiple references, standing alone, are not "evidence." See In re Dembiczak, 175 F.3d 994 at 1000, 50 USPQ2d 1614 at 1617. However, the suggestion to combine need not be express and "may come from the prior art, as filtered through the knowledge of one skilled in the art." Motorola, Inc. v. Interdigital Tech. Corp., 121 F.3d 1461, 1472, 43 USPQ2d 1481, 1489(Fed. Cir. 1997).

It is impermissible for an Examiner to engage in hindsight reconstruction of the claimed invention using appellant's structure as a template and selecting elements from references to fill the page. The references themselves must provide some teaching whereby the appellant's combination would have been obvious. In re Gorman, 911 F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed. Cir, 1991). That is, something in the prior art as a whole must suggest the desirability, and thus obviousness, of making the combination. See, In re Beattie, 974 F.2d 1309, 1312, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992); Lindemann Machinenfabrik GMBH v. American Hoist and Derrick Co., 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984).

VI. ARGUMENT

A. Group I, Claims 1-4, 10-13 and 19-22

Claims 1-4, 10-13 and 19-22 are not obvious over Borg. Claims 1-4, 10-13 and 19-22, inter alia, recite generating information that designates the overmarked pixels, performing raster image processing to create a raster image of the color image, the raster image processing including overmarking processing that allows both the at least one first color and the second color to be included in the overmarked pixels in the same raster image, and modifying image data of the overmarked pixels in the raster image.

The Final Office Action admits that Borg does not disclose that the first color and the second color are be included in the overmarked pixels in the same raster image, as claimed in independent claims 1 and 10. However, the Office Action asserts that Borg discloses all other recited features of claims 1 and 10.

Specifically, the Office Action, at page 2, asserts that Borg, in Fig. 2, discloses generating information that designates the overmarked pixels (items 200, 205 in Fig. 2), performing image processing to create an image of the color image, the image processing including overmarking processing that allows both the at least one first color and the second color to be included in the overmarked pixels (item 210 in Fig. 2), and modifying image data of the overmarked pixels in the raster image (item 215 in Fig. 2). The Office Action's assertion is incorrect.

Borg fails to explicitly teach or suggest the recited feature of generating information that designates the overmarked pixels, as claimed in claims 1 and 10.

As disclosed in the specification at page 5, line 32 to page 6, line 6, in this invention, generating information that designates the overmarked pixels is performed on a pixel-by-pixel basis:

> overmarked pixel designator 140 generates information that designates overmarked pixels among the color image pixel data. Overmarked pixels are pixels in which a top color, such as black, is to be marked over any combination of underlying colors, such as cyan, magenta and yellow. Specifically, in the exemplary embodiment shown in Fig. 1, the tag generator 142 in the overmarked pixel designator 140 generates a tag for each overmarked pixel. The tags are associated with the respective overmarked pixels, and designate the overmarked pixels as "black image", "black text", "black stroke" or the like.
>
> (emphasis added)

In contrast, Borg is unclear about the details, or only cursorily states how the pixels in the image data are being designated for processing. Borg does not explicitly designate

overmarked pixels, but instead merely states that "any position x, y within an image area" may be designated to be processed (See Borg, at col. 5, lines 1-3). However, an image may be designated to be processed using a number of different ways, including processing the image data on a region or zone basis, a macro image area basis, a pixel basis, or a sub-pixel unit basis. The Office Action cannot assume or infer that generating information that designates the overmarked pixels is done on a pixel by pixel basis unless this necessarily occurs as part of the process, or is the only way to process the image data. As discussed above, generating information that designates the overmarked pixels can be performed using at least four approaches. Therefore, it would not be obvious to use the vague teachings in Borg to achieve the claimed invention as claimed in claims 1 and 10.

Further, while Borg may arguably teach a raster image processor that blends the images in accordance with a specified blending mode, Appellants respectfully submit that Borg fails to explicitly teach or suggest that the first color and the second color are be included in the overmarked pixels in the same raster image, as claimed in claims 1 and 10.

The Office Action, at page 3, asserts that it "would have been obvious to one skilled in the art at the time the invention was made to consider the raster image processor in Borg et al. output a raster image that allows both the at least one first color and the second color to be includes [sic] since the raster image processor produces a blended image which includes a combination of the foreground and background colors."

Appellants also respectfully point out that the rejection fails to demonstrate a clear and particular teaching to motivate one to modify Borg. The alleged motivation is just an inference drawn by the Office Action from Borg and thus is not a clear and particular teaching in Borg. In fact, the inference in the Office Action clearly did not lead Borg to make the asserted modification. The alleged motivation is nothing more than speculation and is actually based on Appellants' disclosure rather than Borg's disclosure.

Moreover, the case law requires that for motivation to be proper, showing that something is feasible is not enough. Just because something may be feasible does not mean that it is desirable or that one of ordinary skill in the art would be motivated to do what is feasible. See Winner International Royalty Corp. v. Wang, 53 USPQ2d 1580 (Fed. Cir. 2000) which points out that motivation to combine references requires a showing not just of feasibility, but also of desirability.

The only desirability of modifying Borg to arrive at the claimed subject matter is found in Appellants' disclosure and it is fundamentally improper to use Appellants' disclosure against them.

Accordingly, the subject matter of claims 1 and 10 is not rendered obvious by Borg.

B. Group II, Claims 5 and 14

With respect to the merits of claims 5 and 14, in addition to not showing the features of claims 1 and 10 as discussed above, Borg does not disclose, teach or suggest that the modified value of the image data corresponding to the at least one first color results in a reduced amount of marking material corresponding to the at least one first color being applied to a marking substrate, as claimed in claims 5 and 14.

Borg is completely devoid of teaching or suggesting this feature of the claimed invention. Borg is concerned with processing page description language (PDL) files so that an output can be optimized for a specific output device.

In contrast to Borg, in the invention, as disclosed at page 6, line 30 to page 7, line 9,

> [a]data modification unit 160 modifies values of data that corresponds to the underlying colors in overmarked pixels. For example, where a value of data that corresponds to an underlying color in an overmarked pixel indicates an amount of corresponding marking material to be put down on a marking substrate, the data modification unit 160 reduces this value so that a reduced amount of the corresponding marking material will be put down.

> The amount by which the marking material is reduced may be determined according to previously determined methods. For example, each underlying color present may be reduced by a specified percentage, and/or reduction may be performed such that the total amount of marking material to be applied for a given pixel is less than or equal to a specified amount.

Borg fails to teach or suggest, either implicitly or explicitly, the above claim feature as claimed in claims 5 and 14. Accordingly, the subject matter of claims 5 and 14 is not rendered obvious by Borg.

C. Group III, Claims 6, 7, 15 and 16

The Office Action admits that Borg does not teach or suggest that generating information that designates the overmarked pixels comprises generating tags that correspond to the overmarked pixels, as claimed in claims 6 and 15. Further, the Office Action admits that Borg does not teach or suggest that the overmarked pixels correspond to a black image and the tags indicate that the overmarked pixels are black image pixels, as claimed in claims 7 and 16.

However, the Office Action asserts that Shaughnessy makes up for the deficiencies of Borg. Appellants respectfully disagree with this assertion.

Shaughnessy, at Abstract, col. 3, line 65 to col. 6, line 22, col. 7, lines 10-64, and in Figs. 3a-3d, only discloses a method and apparatus for manually editing an original document that has been processed through a scanner. In Shaughnessy, an operator uses a highlighter, such as felt-tip pen, to manually mark an area of a document with various symbols or codes. The symbols and codes manually inputted on the document are then interpreted by a copier apparatus to include or exclude certain portions of the document. Since in Shaughnessy various document areas are manually marked without any pixel specificity, Shaughnessy cannot teach or suggest generating tags that correspond to the overmarked pixels.

Further, because Shaughnessy is directed to manually editing a document for later processing, Appellants submit that it would not have been obvious to modify Borg in the manner taught by Shaughnessy. Thus, The Office Action has not its burden of presenting a prima facie case of obviousness. The mere fact that the prior art may be modified in the manner suggested by the examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). To establish prima facie obviousness of a claimed invention, all the claim limitations must be suggested or taught by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1970). The showing of evidence must be clear and particular, and broad conclusory statements about the teaching of multiple references, standing alone, are not "evidence." See In re Dembiczak, 175 F.3d 994 at 1000, 50 USPQ2d 1614 at 1617.

In contrast with Borg and Shaughnessy, in the invention, as described at page 5, line 32 to page 6, line 2, overmarked pixels are pixels in which a top color, such as black, is to be marked over any combination of underlying colors, such as cyan, magenta and yellow. In one exemplary embodiment, as disclosed in the specification at page 6, lines 3-17, and in Fig. 4, generating information that designates the overmarked pixels includes generating a tag for each overmarked pixel.

Borg in combination with Shaughnessy fails to teach or suggest, either implicitly or explicitly, the above claim feature as claimed in claims 6, 7, 15 and 16. Accordingly, the subject matter of claims 6, 7, 15 and 16 is not rendered obvious by Borg in combination with Shaughnessy.

D. Group IV, Claims 8 and 17

The Office Action admits that Borg does not teach or suggest that the overmarked pixels correspond to one of black text and a black stroke, and the tags indicate that the overmarked pixels are one of black text pixels and black stroke pixels.

However, the Office Action asserts that Shaughnessy makes up for the deficiencies of Borg. Appellants respectfully disagree with this assertion.

As discussed above, Shaughnessy, at Abstract, col. 3, line 65 to col. 6, line 22, col. 7, lines 10-64, and in Figs. 3a-3d, only discloses a method and apparatus for manually editing an original document that has been processed through a scanner. Because in Shaughnessy various document areas are manually marked without any pixel specificity, Shaughnessy cannot teach or suggest generating tags that correspond to the overmarked pixels.

Further, because Shaughnessy is directed to manually editing a document for later processing, Appellants submit that it would not have been obvious to modify Borg in the manner taught by Shaughnessy.

In contrast, in one exemplary embodiment of the invention, as disclosed in the specification at page 6, lines 3-17, and in Fig. 4, generating information that designates the overmarked pixels includes generating a tag for each overmarked pixel. The tags are associated with the respective overmarked pixels, and designate the overmarked pixels as "black image", "black text", "black stroke" or the like.

Thus, Borg in combination with Shaughnessy fails to teach or suggest, either implicitly or explicitly, the above claim feature as claimed in claims 8 and 17. Accordingly, the subject matter of claims 8 and 17 is not rendered obvious by Borg in combination with Shaughnessy.

E. Group V, Claims 9 and 18

The Office Action admits that Borg does not teach or suggest that generating information that designates the overmarked pixels comprises performing pattern recognition that recognizes specified patterns; and designating pixels that form the recognized patterns as the overmarked pixels, as claimed in claims 9 and 18.

However, the Office Action asserts that Shaughnessy makes up for the deficiencies of Borg. Appellants respectfully disagree with this assertion.

As discussed above, Shaughnessy, at Abstract, col. 3, line 65 to col. 6, line 22, col. 7, lines 10-64, and in Figs. 3a-3d, only discloses a method and apparatus for manually editing an original document that has been processed through a scanner. Because in Shaughnessy various document areas are manually marked without any pixel specificity, Shaughnessy cannot teach or suggest performing pattern recognition that recognizes specified patterns. In Shaughnessy, the operator performs the evaluation (i.e., recognition) of the area of the document. Further, because a manual operator performs the pattern/editing recognition of the document data, the operator cannot designate pixels that form the recognized patterns as the overmarked pixels.

In contrast, in the invention, as disclosed in the specification at page 7, lines 21-31, page 8, lines 16-20, and in Fig. 5, generating information that designates the overmarked pixels includes performing pattern recognition that recognizes specified patterns.

Thus, Borg in combination with Shaughnessy fails to teach or suggest, either implicitly or explicitly, the above claim feature as claimed in claims 9 and 18. Accordingly, the subject matter of claims 9 and 18 is not rendered obvious by Borg in combination with Shaughnessy.

VII. CONCLUSION

For at least the reasons outlined above, Borg does not render obvious claims 1-5, 10-14 and 19-22 under 35 USC §103(a), and the Borg and Shaughnessy combination does not render obvious claims 6-9 and 15-18 under 35 USC §103(a). Thus, claims 1-22 define subject matter that is patentable over the applied references.

The Honorable Board is requested to reverse the rejections set forth in the Final Rejection and return the application to the Examiner to pass this case to issue.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

George P. Simion
Registration No. 47,089

JAO:GPS/hs

Enclosure:
Appendix

Date: April 30, 2003

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
Charge any fee due to our Deposit Account No. 24-0037

APPENDIX OF CLAIMS

1. (Amended) A method of processing image data of a color image for marking, the color image containing overmarked pixels where at least one first color is to be overmarked by a second color, the method comprising:

generating information that designates the overmarked pixels;

performing raster image processing to create a raster image of the color image, the raster image processing including overmarking processing that allows both the at least one first color and the second color to be included in the overmarked pixels in the same raster image; and

modifying image data of the overmarked pixels in the raster image.

2. The method as set forth in claim 1, wherein modifying the image data of the overmarked pixels comprises modifying image data corresponding to the at least one first color.

3. The method as set forth in claim 1, further comprising outputting the raster image, including the modified image data, to a marking driver.

4. The method as set forth in claim 1, wherein modifying image data of the overmarked pixels comprises modifying a value of image data corresponding to the at least one first color.

5. The method as set forth in claim 4, wherein the modified value of the image data corresponding to the at least one first color results in a reduced amount of marking material corresponding to the at least one first color being applied to a marking substrate.

6. The method as set forth in claim 1, wherein generating information that designates the overmarked pixels comprises generating tags that correspond to the overmarked pixels.

7. The method as set forth in claim 6, wherein the overmarked pixels correspond to a black image and the tags indicate that the overmarked pixels are black image pixels.

8. The method as set forth in claim 6, wherein the overmarked pixels correspond to one of black text and a black stroke, and the tags indicate that the overmarked pixels are one of black text pixels and black stroke pixels.

9. The method as set forth in claim 1, wherein generating information that designates the overmarked pixels comprises performing pattern recognition that recognizes specified patterns; and designating pixels that form the recognized patterns as the overmarked pixels.

10. (Amended) A system that processes image data of a color image for marking, the color image containing overmarked pixels where at least one first color is to be overmarked by a second color, the system comprising:

an overmarked pixel designator that generates information that designates the overmarked pixels;

a raster image processor that creates a raster image of the color image, the raster image processor provided with an overmarking function that allows both the at least one first color and the second color to be included in the overmarked pixels of the same raster image; and

an image data modification unit that modifies image data of the overmarked pixels in the raster image.

11. The system as set forth in claim 10, wherein the modified image data is image data corresponding to the at least one first color.

12. The system as set forth in claim 10, further comprising a marking driver that performs marking according to the raster image, including the modified image data.

13. The system as set forth in claim 10, wherein the image data modification unit modifies a value of image data corresponding to the at least one first color.

14. The system as set forth in claim 13, further comprising a marking driver that performs marking according to the raster image that includes the modified image data, wherein the marking driver marks a reduced amount of marking material corresponding to the at least one first color on a marking substrate based on the modified value of the image data corresponding to the at least one first color.

15. The system as set forth in claim 10, wherein the overmarked pixel designator comprises a tag generator that generates tags that correspond to the overmarked pixels.

16. The system as set forth in claim 15, wherein the overmarked pixels correspond to a black image and the tags indicate that the overmarked pixels are black image pixels.

17. The system as set forth in claim 15, wherein the overmarked pixels correspond to one of black text and a black stroke, and the tags indicate that the overmarked pixels are one of black text pixels and black stroke pixels.

18. The system as set forth in claim 10, wherein the overmarked pixel designator comprises a pattern recognition device that recognizes specified patterns and designates pixels that form the recognized patterns as the overmarked pixels.

19. A printer incorporating the system as set forth in claim 10.

20. A digital copier incorporating the system as set forth in claim 10.

21. A storage medium on which is stored a program that implements the method set forth in claim 1.

22. A storage medium on which is stored data that has been processed according to the method set forth in claim 1.

Xerox Docket No. D/98172

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Robert R. BUCKLEY et al.

On Appeal from Group: 2622

Application No.: 09/368,354

Examiner: M. Nguyen

Filed: August 5, 1999

Docket No.: 103044

For: METHODS AND SYSTEMS FOR UNDERCOLOR REDUCTION

APPEAL BRIEF TRANSMITTAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached hereto are three (3) copies of our Brief on Appeal in the above-identified application.

The Commissioner is hereby authorized to charge Deposit Account No. 24-0037 in the amount of Three Hundred Twenty Dollars ($320.00) in payment of the Brief fee under 37 C.F.R. 1.17(f). In the event of any underpayment or overpayment, please debit or credit our Deposit Account No. 24-0037 as needed in order to effect proper filing of this Brief.

For the convenience of the Finance Division, two additional copies of this transmittal letter are attached.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

George P. Simion
Registration No. 47,089

JAO:GPS/ldg
Date: April 30, 2003

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
Charge any fee due to our Deposit Account No. 24-0037

Xerox Docket No. D/98172

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Robert R. BUCKLEY et al.

Application No.: 09/368,354

Filed: August 5, 1999

On Appeal from Group: 2622

Examiner: M. Nguyen

Docket No.: 103044

For: METHODS AND SYSTEMS FOR UNDERCOLOR REDUCTION

APPEAL BRIEF TRANSMITTAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached hereto are three (3) copies of our Brief on Appeal in the above-identified application.

The Commissioner is hereby authorized to charge Deposit Account No. 24-0037 in the amount of Three Hundred Twenty Dollars ($320.00) in payment of the Brief fee under 37 C.F.R. 1.17(f). In the event of any underpayment or overpayment, please debit or credit our Deposit Account No. 24-0037 as needed in order to effect proper filing of this Brief.

For the convenience of the Finance Division, two additional copies of this transmittal letter are attached.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

George P. Simion
Registration No. 47,089

JAO:GPS/ldg
Date: April 30, 2003

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
Charge any fee due to our Deposit Account No. 24-0037